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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/028,456	12/20/2001	Kenji Kondo	5077-000079	2028
27572	7590	04/07/2006	EXAMINER	
HARNESS, DICKEY & PIERCE, P.L.C.			STREGE, JOHN B	
P.O. BOX 828			ART UNIT	
BLOOMFIELD HILLS, MI 48303			PAPER NUMBER	

2624

DATE MAILED: 04/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/028,456	Applicant(s) KONDO ET AL.	
	Examiner John B. Strege	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on 03 February 2006.

2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) 1,3-9 and 11-19 is/are pending in the application.

4a) Of the above claim(s) 12-15 and 19 is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) 1,3-9,11 and 16-18 is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on 20 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some * c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. _____.

3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
 Paper No(s)/Mail Date _____.

4) ☒ Interview Summary (PTO-413)
 Paper No(s)/Mail Date. 4/3/06.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

Response to Amendment

The amendment received 2/3/06 has been entered in full.

Response to Arguments

Applicant's arguments with respect to claims 1,3-9,11, and 16-18 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
2. Claims 1 recites the limitation "the top predetermined rate" in line 14, and claim 16 recites the same limitation in line 15. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
4. Claims 1,3-4,6, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kado et al. USPN 5,995,639 (hereinafter "Kado"), in view of Poggio et al. USPN 5,642,431 (hereinafter "Poggio") in view of Mizutani et al. USPN 5,844,565

(hereinafter "Mizutani") and further in view of the applicant's admitted prior art (hereinafter "AAPA").

Kado discloses a method for detecting an eye position from a face image including at least an eye area (col. 1 lines 59-67), comprising the steps of:

Calculating brightness gradient vectors for the face image (Kado discloses using a Sobel operator to extract edge vectors with the magnitude displayed by brightness which is read as the brightness gradient vectors [col. 4 lines 45-59]).

Kado further discloses performing matching between a brightness gradient image generated using the calculated brightness gradient vectors and an eye template (col. 5 lines 40-47) and detecting the eye position based on the matching (col. 5 lines 47-57, and col. 6 lines 4-10).

Kado also discloses performing brightness correction for part or the entire of the face image to increase the contrast between a sclera portion and an iris portion of the eye (figure 14 discloses a brightness correction section 19, col. 7 lines 22-52), the contrast between the sclera portion and the iris portion would inherently be increased by the brightness correction step), although this occurs after the matching of the brightness gradient vector and the eye template. However it would have been obvious to one of ordinary skill in the art that this processing could have been carried out before calculating the brightness gradient vectors in order to have a standard illumination image to carry out the processing on. Kado does not explicitly disclose the details of the brightness correction step.

Poggio discloses that there is a problem with traditional face detection using template matching because of the variations in imaging caused by illumination (col. 1 lines 53-61). In order to make the system more robust for detection purposes Poggio discloses a preprocessor (140 of figure 2) that normalizes and filters input images (col. 2 lines 13-15) and contains a brightness correction section. Furthermore as seen in figure 4 this is done in order to correct the illumination gradient (step 404) in order to make the detection more robust to variations in illumination. As in the case of Kado, the brightness correction of the face would inherently increase the contrast between a sclera portion and the iris portion.

At the time of the invention it would have been obvious to one of ordinary skill in the art to modify Kado to carry out the brightness correction on the face image in order to normalize the image before further processing to detect the eyes. The motivation is that it would make the image have standard illumination so that the further processing would be more accurate and the eye detection would be more robust.

Furthermore Poggio discloses that the brightness correction step includes calculating a brightness gradient for each pixel in a part of the face image (figure 4, 404 col. 9 lines 34-48); and performing histogram equalization for all pixels in the part (figure 4, 405 col. 9 lines 48-54).

Poggio does not explicitly disclose generating an expression for conversion for histogram equalization using pixels in the part having a brightness gradient intensity falling with a top predetermined rate.

Mizutani discloses a method for modifying images to have a more uniform luminance (brightness correction) by locating the contrast edges in the image (see the abstract). The brightness gradients (edges) are calculated by use of a Sobel filter (col. 8 lines 40-67). The results of the sobel filtering are limited to the range of permissible luminance values (thus generating an expression for conversion for histogram equalization using pixels in the part having a brightness gradient intensity falling within a top predetermined rate) before carrying out a histogram equalization (col. 9 lines 1-9, and lines 57-67). The benefit of carrying out this procedure is that the emphasis of the edges in the image is enhanced (col. 10 lines 2-3).

Kado, Poggio, and Mizutani are analogous art because they are all from the same field of endeavor of brightness correction of facial images.

At the time of the invention it would have been obvious to combine Kado, Poggio, and Mizutani to generate an expression for conversion for histogram equalization using pixels in the part having a brightness gradient intensity falling with a top predetermined rate. The motivation for doing so is that it would enhance the emphasis of the edges as described by Mizutani (paragraph bridging cols. 9-10).

Neither Kado, Poggio, nor Mizutani explicitly disclose using near infrared light to capture the image however it is well known in the art of facial image capture to use infrared light as admitted by the applicant (page 3 lines 9-15). At the time of the invention it would have been obvious to one of ordinary skill of the art to combine Kado, Poggio and Mizutani as disclosed, and to further use near infrared light. The motivation for doing so is that it would prevent the subject of the photograph from being dazzled as

stated by the applicant. Thus it would have been obvious to one of ordinary skill in the art to combine Kado, Poggio, Mizutani and the AAPA to obtain the invention of claim 1.

Regarding claims 3-4, as discussed Kado discloses using a Sobel operator which is a filter capable of intensifying edges.

Regarding claim 6, Kado discloses performing brightness correction on the face image following the feature extraction in which the features are split into different partial areas (col. 7 lines 26-52).

Claim 16 is similar to claim 1, thus the same arguments used for claim 1 apply equally to claim 16.

5. Claims 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kado et al. USPN 5,995,639 (hereinafter "Kado") in view of Poggio et al. USPN 5,642,431, in view of Mizutani USPN 5,844,565 in view of the applicant's admitted prior art and further in view of Chen et al. USPN 6,792,134 (hereinafter "Chen").

Claim 7 further discloses splitting the area into right and left parts. As the face is symmetrical it is obvious that in searching for the eyes the face image can be separated into left and right parts to speed up the detection steps. Chen discloses a method for detecting the position of the eyes in which a histogram equalization is carried out (brightness correction) and the face image 904 (figure 9) is split into a left-half region 908 and a right half region 910 (col. 8 lines 35-43).

Kado, and Chen are all analogous art because they are all from the same field of endeavor of detecting the position of the eyes.

At the time of the invention it would have been obvious to one of ordinary skill in the art to split the face image into left and right section so that the eye detection may be carried out in an area half as large and thus processing time is increased. Thus it would have been obvious to combine Kado, Poggio, Mizutani and the applicant's admitted prior art and Chen to obtain the invention as specified in claim 7.

Regarding claim 8, Kado discloses a nose region (figure 2a) and further that a nose and mouth are present on an equidivision perpendicular line between two irises.

6. Claims 11,5 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kado et al. USPN 5,995,639 (hereinafter "Kado") in view Poggio USPN 5,642,431, in view of Mizutani USPN 5,844,565, in view of the applicant's admitted prior art and further in view of Odaka et al. USPN 6,035,054.

Claim 11 discloses similar limitations to claim 1 (rejected with Kado) thus only the additional limitations will be discussed. Claim 11 has the added limitation that in the matching step points on the brightness gradient image corresponding to pixels of the face image having a brightness value greater than a predetermined value are excluded from correlation value calculation for the matching. As discussed Kado discloses using edge vectors which are displayed according to brightness in order to detect the areas of the face where the features are located (col. 4 lines 43-59). Kado does not explicitly disclose excluding points on the face image having a brightness value greater than a predetermined value from correlation calculation. However, the features are determined based on the correlation of edge vectors which are points of the face image with low

brightness (as taught by Odaka, discussed below), thus by forming the edge vectors brightness values greater than a predetermined value (for example those values outside the edge) are excluded.

Odaka receives an image of a users eyes and detects the pupils edges (col. 18 lines 1-17). Odaka teaches that point which has been detected as an edge point is essentially a minimum luminance value (col. 20 lines 36-50). Odaka proceeds to find the true edge points by excluding any point which is not appropriately regarded as the pupil's edge by reexamining the minimum luminance value of the detected points (also in col. 20 lines 36-50). If the luminance value is small compared to a threshold the process will proceed to subsequent steps (col. 20 lines 51-56).

Kado and Odaka are analogous art because they are both defining the edges of facial features. Based on the teaching of Odaka it is obvious that in Kado's invention, by separating the face image into edge vectors (brightness gradient vectors) the points on the face which have a greater brightness value (for example non-edges) are being excluded from the correlation process that is carried out to detect the position of the eyes (correlation process disclosed col. 5 lines 5-57).

Claim 5 discloses performing brightness correction when the calculated average brightness is smaller than a predetermined value while performing no brightness correction when it is equal to or greater than the predetermined value. Using the same argument as stated above the brightness correction is carried out on the edge vectors which represent the areas of low brightness. Thus as the brightness correction is carried

out on the edge vectors it is obvious that it is only being carried out on areas lower than the average brightness of the image.

Claim 18 is similar to claim 11, thus the same arguments used for claim 11 apply equally to claim 18.

7. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kado et al. USPN 5,995,639 (hereinafter "Kado") in view of Poggio USPN 5,642,431, in view of Mizutani et al. USPN 5,844,565, in view of the applicant's admitted prior art, and further in view of Eriksson *Eye-tracking for Detection of Driver Fatigue* (as cited in the IDS).

Kado does not explicitly disclose that the eye templates multiple points are arranged in n concentric circles where n is greater than or equal to 2.

Eriksson discloses a template for estimating the position of the iris which has two concentric circles a_1 and a_2 (seen in figure 3). This is effective because a good match is determined when the inner circle is centered on the iris and the outside circle covers the sclera.

Kado and Eriksson are analogous art because they are from the same field of endeavor of using eye templates to locate the eyes.

At the time of the invention it would have been obvious to one of ordinary skill in the art to form an eye template made of two concentric circles. The motivation for doing so is that it allows for a good match to be found based on the difference between the iris and the sclera. Thus it would have been obvious to one of ordinary skill in the art to

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combine Kado, Poggio, Mizutani, the applicant's admitted prior art, and Eriksson to obtain the invention as specified in claim 9.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

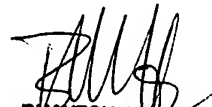
Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John B. Strege whose telephone number is (571) 272-7457. The examiner can normally be reached on Monday-Friday between the hours of 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (571) 272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JS


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